MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3, 2016/2017

BMT1014 –MANAGERIAL MATHEMATICS

(All sections / Groups)

1st JUNE 2017
2.30 p.m - 4.30 p.m
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This Question paper consists of **5 pages** including with **4 Questions** only.
2. Attempt **ALL** questions and write your answers in the Answer Booklet provided.
3. The candidate is allowed to use scientific calculators that are permitted to be used in the examination.

Question 1 (25 marks)

(a) Solve the quadratic-form equation $\frac{1}{x^4} - \frac{9}{x^2} + 8 = 0$.

[6 marks]

(b) Solve $\sqrt{x} - \sqrt{3x+1} + 1 = 0$.

[4 marks]

(c) Solve the inequality equation $|1 - 3x| > 2$.

[5 marks]

(d) Find an equation of a line passing through (4, -5) and perpendicular to the line $3y = -\frac{2x}{5} + 3$.

[4 marks]

(e) The demand function for a production line of computer is $p = 2400 - 6q$, where p is the price per unit when q units are demanded by consumers. Find the level of production that will maximize the manufacturer's total revenue, and determine this revenue (revenue, $r = pq$).

[6 marks]

Question 2 (25 marks)

(a) Labor costs for a farmer are *RM55 per acre for corn* and *RM45 per acre for onion* in Cameron Highland. How many acres of each crop should the farmer plant if he wants to spend no more than RM6900 on labor? Express the linear inequality and draw its graph.

[4 marks]

(b) Find the *region* and the *corner points* described by $\begin{cases} 6x + 3y \leq 24 \\ 3x + 6y \leq 30 : \\ x \geq 0, y \geq 0 \end{cases}$

[9 marks]

Continued...

(c) *Minimize* the cost function $C = 3x + 2y$
subject to the constraints

$$\begin{aligned} 2x + y &\geq 5 \\ 3x + y &\geq 4 \\ x + 2y &\geq 3 \\ x, y &\geq 0 \end{aligned}$$

[12 marks]

Question 3 (25 marks)

(a) A bank has a finance charge of 1.5% per month on the outstanding indebtedness. What is the *nominal rate compounded monthly* and what is the *effective rate*?

[6 marks]

(b) Find *present value* of an ordinary annuity of RM460 every month for *nine years* at the rate of 6% compounded monthly.

[7 marks]

(c) A trust fund is being set up by a single payment so that at the *end of 30 years* there will be \$50,000 in the fund. If interest is compounded continuously at an *annual rate of 6%*, how much money should be paid into the fund initially?

[5 marks]

(d) In 10 years, a \$40,000 machine will have a *salvage value of \$4000*. A new machine at that time is expected to sell for \$52,000. In order to provide funds for the difference between the replacement cost and the salvage value, a sinking fund is set up into which equal payments are placed at the end of each year. If the fund earns *7% compounded annually*, how much should each payment be?

[7 marks]

Continued...

Question 4 (25 marks)

(a) Use the *product rule* to determine the dy/dx for function

$$y = (x^2 + 5x - 7)(6x^2 - 5x + 4)$$

[4 marks]

(b) Use the *quotient rule* to determine the dy/dx for function

$$y = \frac{2x - 3}{4x + 1}$$

[4 marks]

(c) If $f(x, y) = x^3y^2 + x^2y - x^2y^2$, find $f_{xxy}(2,3)$ and $f_{xyx}(2,3)$.

[5 marks]

(d) Evaluate the definite integrals

$$\int_2^3 (x + 2)^3 \, dx$$

$$\int_2^{e+1} \frac{1}{x - 1} dx$$

[5 marks]

(e) Find the area of the region bounded by $2y = 4x - x^2$ and $2y = x - 4$.

[7 marks]

End of Page.

Course: Managerial Mathematics
Code: BMT1014

Summary of Principal Formulas and Terms

Simple Interest

(i) Interest, $I = Prt$ (P = principal, r = interest rate, t = number of years)
(ii) Accumulated amount, $A = P(1 + rt)$

Compound Interest

(i) Accumulated amount, $A = P(1+i)^n$, where $i = \frac{r}{m}$, and $n = mt$
(m = number of conversion periods per year)

(ii) Present value for compound interest, $P = A(1+i)^{-n}$

Effective Rate of Interest

$$r_{eff} = \left[1 + \frac{r}{m}\right]^m - 1$$

Future Value of an Annuity

$$S = R\left[\frac{(1+i)^n - 1}{i}\right]$$ (S = future value of ordinary annuity of n payments of R dollars periodic payment)

Present Value of an Annuity

$$P = R\left[\frac{1-(1+i)^{-n}}{i}\right]$$ (P = present value of ordinary annuity of n payments of R dollars periodic payment)

Amortization Formula

$$R = \frac{Pi}{1-(1+i)^{-n}}$$ (R = periodic payment on a loan of P dollars to be amortized over n periods)

Sinking Fund Formula

$$R = \frac{Si}{(1+i)^n - 1}$$ (R = periodic payment required to accumulate S dollars over n periods)